

**AMENDMENTS TO THE SPECIFICATION:**

Please amend the specification at the following paragraphs:

Page 2, line 37:

These repetitive motifs of 17 amino acids SEQ. ID NO.:1) are represented by the formula:

**Leu-Ala-Lys-Glu-Lys-Leu-Gln-X-Gln-Gln-Ser-Asp-Leu-Glu-Gln-Glu-Arg**

in which X is Glu or Gly.

Page 3, line 15:

Reference will be made in what follows to the Figures in which:

- Figure 1 presents a recombinant protein (SEQ. ID No.:31) of the invention of 316 amino acids, designated hereafter as antigen 536 or protein LSA-R-NR,

- Figure 2 provides the nucleotide sequence (SEQ. ID NO.:32) of one of the recombinant nucleic acids studied (clone DG536) and which codes for the polypeptide LSA-R-NR,

- Figure 3 presents a polypeptide (SEQ. ID NO.: 24) of the invention of 151 amino acids, designated hereafter as antigen 729S,

- Figure 4 corresponds to the nucleotide sequence (SEQ. ID NO.:33) of the clone DG729S which codes for the polypeptide of figure 3 (EcoR1 linkers in bold type),

- Figure 5 presents the polypeptide sequences of the antigens LSA-TER (SEQ. ID No.:23), 729S-NRI (SEQ ID NO.26), 729S-NRII (SEQ ID NO.:27), 729S-Rep (SEQ ID NO.:28),

- Figure 6 presents the 5' end of the nucleotide sequence of the LSA gene (SEQ. ID NO.:34),

- Figure 7 presents the coding sequence of the 5' end of the LSA gene (SEQ. ID NOS.:35-36 and 37) and the corresponding polypeptide sequence (SEQ. ID NO.:38),

- Figure 8 describes the 3' end of the LSA gene (SEQ. ID NO.:39),

- Figure 9 gives the sequence of the 3' end of the LSA gene (SEQ. ID NOS.:40-41 and 42) as well as the corresponding polypeptide sequence (SEQ. ID NO.:43),

- Figure 10 repeats the sequences (SEQ. ID NOS.:44-47) given in Figure 9, up to the termination codon *stop* and the terminal amino acid.

Page 4, line 6:

More particularly, the subject of the invention is any molecule or polypeptide composition bearing at least one peptide sequence bearing all or part of one or more epitopes characteristic of a protein produced in the hepatocytes infected by *P. falciparum*, and more particularly bearing all or part of one or more T epitope(s) of the proteins produced at the hepatic stage of *P. falciparum*, characterized in that this peptide sequence is represented by all or part of the sequence of the last 279 amino acids shown in Figure 10, this amino acid sequence being optionally preceded

by all or part of one or more of the sequences (SEQ. ID NOS.:2-10) of 17 amino acids of formula:

X<sub>1</sub>DLEQX<sub>2</sub>RX<sub>3</sub>AKEKLQX<sub>4</sub>QQ  
QX<sub>1</sub>DLEQX<sub>2</sub>RX<sub>3</sub>AKEKLQX<sub>4</sub>Q  
QQX<sub>1</sub>DLEQX<sub>2</sub>RX<sub>3</sub>AKEKLQX<sub>4</sub>  
X<sub>4</sub>QQX<sub>1</sub>DLEQX<sub>2</sub>RX<sub>3</sub>AKEKLQ  
QX<sub>4</sub>QQX<sub>1</sub>DLEQX<sub>2</sub>RX<sub>3</sub>AKEKL  
LQX<sub>4</sub>QQX<sub>1</sub>DLEQX<sub>2</sub>RX<sub>3</sub>AKEK  
KLQX<sub>4</sub>QQX<sub>1</sub>DLEQX<sub>2</sub>RX<sub>3</sub>AKE  
EKLQX<sub>4</sub>QQX<sub>1</sub>DLEQX<sub>2</sub>RX<sub>3</sub>AK  
KEKLQX<sub>4</sub>QQX<sub>1</sub>DLEQX<sub>2</sub>RX<sub>3</sub>A  
AKEKLQX<sub>4</sub>QQX<sub>1</sub>DLEQX<sub>2</sub>RX<sub>3</sub>  
X<sub>3</sub>AKEKLQX<sub>4</sub>QQX<sub>1</sub>DLEQX<sub>2</sub>R  
RX<sub>3</sub>AKEKLQX<sub>4</sub>QQX<sub>1</sub>DLEQX<sub>2</sub>  
X<sub>2</sub>RX<sub>3</sub>AKEKLQX<sub>4</sub>QQX<sub>1</sub>DLEQ  
QX<sub>2</sub>RX<sub>3</sub>AKEKLQX<sub>4</sub>QQX<sub>1</sub>DLE  
EQX<sub>2</sub>RX<sub>3</sub>AKEKLQX<sub>4</sub>QQX<sub>1</sub>DL  
LEQX<sub>2</sub>RX<sub>3</sub>AKEKLQX<sub>4</sub>QQX<sub>1</sub>D  
DLEQX<sub>2</sub>RX<sub>3</sub>AKEKLQX<sub>4</sub>QQX<sub>1</sub>

in which:

°X<sub>1</sub> is "Ser" or "Arg",

°X<sub>2</sub> is "Glu" or "Asp"

°X<sub>3</sub> is "Arg" or "Leu"

°X<sub>4</sub> is "Glu" or "Gly".

Page 5, line 6,

Consequently, the invention relates more particularly to any molecule or polypeptide composition bearing at least one peptide sequence bearing all or part of one or more epitopes characteristic of a protein produced in the hepatocytes infected by *P. falciparum*, and more particularly bearing all or part of one or more T epitope(s) of the proteins produced at the hepatic stage of *P. falciparum*, characterized in that this peptide sequence is represented by all or part of the following amino acid sequence (SEQ. ID NO.:19):

RKADTKKNLERKKEHGDILAEDLYGRLEIPAIELPS  
ENERGYYIPHQSSLPQDNRGNSRDSKEISIIEKTNR  
ESITTNVGRRDIHKGHLEEKKDGSIKPEQKEDKS

this amino acid sequence being optionally preceded by all or part of one or more sequences (SEQ.ID NOS.:2-18) of 17 amino acids of formula:

X<sub>1</sub>DLEQX<sub>2</sub>RX<sub>3</sub>AKEKLQX<sub>4</sub>QQ  
QX<sub>1</sub>DLEQX<sub>2</sub>RX<sub>3</sub>AKEKLQX<sub>4</sub>Q  
QQX<sub>1</sub>DLEQX<sub>2</sub>RX<sub>3</sub>AKEKLQX<sub>4</sub>  
X<sub>4</sub>QQX<sub>1</sub>DLEQX<sub>2</sub>RX<sub>3</sub>AKEKLQ  
QX<sub>4</sub>QQX<sub>1</sub>DLEQX<sub>2</sub>RX<sub>3</sub>AKEKL  
LQX<sub>4</sub>QQX<sub>1</sub>DLEQX<sub>2</sub>RX<sub>3</sub>AKEK  
KLQX<sub>4</sub>QQX<sub>1</sub>DLEQX<sub>2</sub>RX<sub>3</sub>AKE  
EKLQX<sub>4</sub>QQX<sub>1</sub>DLEQX<sub>2</sub>RX<sub>3</sub>AK  
KEKLQX<sub>4</sub>QQX<sub>1</sub>DLEQX<sub>2</sub>RX<sub>3</sub>A  
AKEKLQX<sub>4</sub>QQX<sub>1</sub>DLEQX<sub>2</sub>RX<sub>3</sub>  
X<sub>3</sub>AKEKLQX<sub>4</sub>QQX<sub>1</sub>DLEQX<sub>2</sub>R  
RX<sub>3</sub>AKEKLQX<sub>4</sub>QQX<sub>1</sub>DLEQX<sub>2</sub>

X<sub>2</sub>RX<sub>3</sub>AKEKLQX<sub>4</sub>QQX<sub>1</sub>DLEQ  
QX<sub>2</sub>RX<sub>3</sub>AKEKLQX<sub>4</sub>QQX<sub>1</sub>DLE  
EQX<sub>2</sub>RX<sub>3</sub>AKEKLQX<sub>4</sub>QQX<sub>1</sub>DL  
LEQX<sub>2</sub>RX<sub>3</sub>AKEKLQX<sub>4</sub>QQX<sub>1</sub>D  
DLEQX<sub>2</sub>RX<sub>3</sub>AKEKLQX<sub>4</sub>QQX<sub>1</sub>

in which

- °X<sub>1</sub> is "Ser" or "Arg",
- °X<sub>2</sub> is "Glu" or "Asp"
- °X<sub>3</sub> is "Arg" or "Leu"
- °X<sub>4</sub> is "Glu" or "Gly".

Page 6, line 16,

The invention relates more particularly to any polypeptide characterized by all or part of the following amino acid sequence (SEQ. ID NO.:20):

LQEQQRDLEQRKADTKKNLERKKEHGDILAEDLYGRLEIPAIELPSENERGYY  
IPHQSSLQDNRGNSRDSKEISIIIEKTNRESITTNVEGRRDIHKGHLEEKDG  
SIKPEQKEDKS

Page 6, line 22:

A preferred polypeptide of the invention is represented by all or part of the following amino acid sequence (SEQ.ID NO.:21).

**DTKKKNLERKKEHGDILAEDLYGRLEIP**

(this polypeptide being designated hereafter by the expression LSA-NR (LSA-non-repeated), or also by any sequence derived from the preceding sequence and modified by the substitution of maximally 40% of the amino acids while retaining its physiological activity such as the induction of a response of the T lymphocytes, in particular the cytotoxic T lymphocytes.

Page 6, line 29:

Another particularly preferred polypeptide of the invention is characterized by all or part of the following amino acid sequence (SEQ. ID NO.:22).

**ERRAKEKLOEQQORDLEQRKADTKK**

(this polypeptide being designated hereafter by the expression LSA-J, or LSA-junction, since it overlaps the repetitive part and the non-repetitive part of the molecule shown in Figure 1).

Page 7, line 1:

Another preferred peptide (SEQ. ID NO.:23), designated LSA-TER, is the following:

**NSRDSKEISIIEKTNRESITTNVEGRRDIHK**

Page 7, line 7:

The subject of the invention is also any molecule or polypeptide composition bearing at least one peptide sequence bearing all or part of one or more epitope(s) characteristic of a protein produced at the sporozoite, hepatic and blood (erythrocytic) stages of *P. falciparum*, and more particularly bearing one or more T epitopes, characterized in that this peptide sequence is represented by all or part of the following amino acid sequence (SEQ. ID NO.:24):

**RDELFNELLNSVDVNNGEVKENILEESQVNDDIFNSLVKSVQQEQQHNVEEKVE  
ESVEEENDEESVEENVEENVEENDGSVASSVEESIASSVDESIDSSIEENVAP  
TVEEIIVAPTVEEIVAPSVEKCAPSVEESVAPSVEESVAEMILKER**

shown in Figure 3 and designated hereafter as the polypeptide 729S.

Page 7, line 22:

According to another advantageous embodiment of the invention, sequences (SEQ ID NOS.26-28) of interested derived from the amino acid sequence of the polypeptide 729S are the following:

- **DELFNELLNSVDVNGEVKENILEESQ,**
- **LEESQVNDDIFSNSLVKSVQQEQQHNV,**
- **VEKCAPSVEESVAPSVEESVAEMLKER.**

Page 8, line 7:

Consequently, the subject of the invention is more particularly any molecule or polypeptide composition comprising at least one peptide sequence bearing all or part of one or more epitopes characteristic of a protein produced in the hepatocytes infected by *P. falciparum*, and bearing more particularly all or part of one or more T epitope(s) of the proteins produced at the hepatic stage of *P. falciparum*, characterized in that this peptide sequence is represented by all or part of the sequence of the first 153 amino acids shown in Figure 7, this amino acid sequence being optionally followed by all or part of one or more sequences (SEQ ID NOS.:2-18) of 7 amino acids of formula:

X<sub>1</sub>DLEQX<sub>2</sub>RX<sub>3</sub>AKEKLQX<sub>4</sub>QQ  
QX<sub>1</sub>DLEQX<sub>2</sub>RX<sub>3</sub>AKEKLQX<sub>4</sub>Q  
QQX<sub>1</sub>DLEQX<sub>2</sub>RX<sub>3</sub>AKEKLQX<sub>4</sub>  
X<sub>4</sub>QQX<sub>1</sub>DLEQX<sub>2</sub>RX<sub>3</sub>AKEKLQ  
QX<sub>4</sub>QQX<sub>1</sub>DLEQX<sub>2</sub>RX<sub>3</sub>AKEKL  
LQX<sub>4</sub>QQX<sub>1</sub>DLEQX<sub>2</sub>RX<sub>3</sub>AKEK  
KLQX<sub>4</sub>QQX<sub>1</sub>DLEQX<sub>2</sub>RX<sub>3</sub>AKE  
EKLQX<sub>4</sub>QQX<sub>1</sub>DLEQX<sub>2</sub>RX<sub>3</sub>AK  
KEKLQX<sub>4</sub>QQX<sub>1</sub>DLEQX<sub>2</sub>RX<sub>3</sub>A  
AKEKLQX<sub>4</sub>QQX<sub>1</sub>DLEQX<sub>2</sub>RX<sub>3</sub>

X<sub>3</sub>AKEKLQX<sub>4</sub>QQX<sub>1</sub>DLEQX<sub>2</sub>R  
RX<sub>3</sub>AKEKLQX<sub>4</sub>QQX<sub>1</sub>DLEQX<sub>2</sub>  
X<sub>2</sub>RX<sub>3</sub>AKEKLQX<sub>4</sub>QQX<sub>1</sub>DLEQ  
QQX<sub>2</sub>RX<sub>3</sub>AKEKLQX<sub>4</sub>QQX<sub>1</sub>DLE  
EQX<sub>2</sub>RX<sub>3</sub>AKEKLQX<sub>4</sub>QQX<sub>1</sub>DL  
LEQX<sub>2</sub>RX<sub>3</sub>AKEKLQX<sub>4</sub>QQX<sub>1</sub>D  
DLEQX<sub>2</sub>RX<sub>3</sub>AKEKLQX<sub>4</sub>QQX<sub>1</sub>

in which:

- °X<sub>1</sub> is "Ser" or "Arg",
- °X<sub>2</sub> is "Glu" or "Asp"
- °X<sub>3</sub> is "Arg" or "Leu"
- °X<sub>4</sub> is "Glu" or "Gly".

Page 9, line 15:

- optionally, all or part of one or more of the sequences (SEQ. ID NOS.:2-18) of 17 amino acids of formula:

X<sub>1</sub>DLEQX<sub>2</sub>RX<sub>3</sub>AKEKLQX<sub>4</sub>QQ  
QQX<sub>1</sub>DLEQX<sub>2</sub>RX<sub>3</sub>AKEKLQX<sub>4</sub>Q  
QQX<sub>1</sub>DLEQX<sub>2</sub>RX<sub>3</sub>AKEKLQX<sub>4</sub>  
X<sub>4</sub>QQX<sub>1</sub>DLEQX<sub>2</sub>RX<sub>3</sub>AKEKLQ  
QQX<sub>4</sub>QQX<sub>1</sub>DLEQX<sub>2</sub>RX<sub>3</sub>AKEKL  
LQX<sub>4</sub>QQX<sub>1</sub>DLEQX<sub>2</sub>RX<sub>3</sub>AKEK  
KLQX<sub>4</sub>QQX<sub>1</sub>DLEQX<sub>2</sub>RX<sub>3</sub>AKE  
EKLQX<sub>4</sub>QQX<sub>1</sub>DLEQX<sub>2</sub>RX<sub>3</sub>AK  
KEKLQX<sub>4</sub>QQX<sub>1</sub>DLEQX<sub>2</sub>RX<sub>3</sub>A

AKEKLQX<sub>4</sub>QQX<sub>1</sub>DLEQX<sub>2</sub>RX<sub>3</sub>  
X<sub>3</sub>AKEKLQX<sub>4</sub>QQX<sub>1</sub>DLEQX<sub>2</sub>R  
RX<sub>3</sub>AKEKLQX<sub>4</sub>QQX<sub>1</sub>DLEQX<sub>2</sub>  
X<sub>2</sub>RX<sub>3</sub>AKEKLQX<sub>4</sub>QQX<sub>1</sub>DLEQ  
QX<sub>2</sub>RX<sub>3</sub>AKEKLQX<sub>4</sub>QQX<sub>1</sub>DLE  
EQX<sub>2</sub>RX<sub>3</sub>AKEKLQX<sub>4</sub>QQX<sub>1</sub>DL  
LEQX<sub>2</sub>RX<sub>3</sub>AKEKLQX<sub>4</sub>QQX<sub>1</sub>D  
DLEQX<sub>2</sub>RX<sub>3</sub>AKEKLQX<sub>4</sub>QQX<sub>1</sub>

in which:

°X<sub>1</sub> is "Ser" or "Arg",

°X<sub>2</sub> is "Glu" or "Asp"

°X<sub>3</sub> is "Arg" or "Leu"

°X<sub>4</sub> is "Glu" or "Gly".

- and all or part of the last 279 amino acids shown in Figure 10.

Page 14, line 25:

As examples of DNA or RNA primers according to the invention,  
mention should be made of the following sequences (SEQ. ID NOS.:24-30):

3' ->5 : TTTCGCTAGATCTTGTT ~~A~~ TCTAAATAGAAGAAA

Page 22, line 22:

As examples of nucleotide probes of the invention, mention should be made of the following sequences (SEQ. ID NOS:29-30):

3'-->5' : **TTTCGCTAGATCTTGT** & **TCTAAATAGAAGAAA**